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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/719,663	05/18/2001	Shinichiro Kawano	MATS:027	3648

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EXAMINER

JONES, JUDSON

ART UNIT

PAPER NUMBER

2834

DATE MAILED: 07/25/2002

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/719,663

Applicant(s)

KAWANO ET AL.

Examiner

Judson H Jones

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE ____ MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 09 July 2002.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-17, 19-24 and 26-28 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 26 and 27 is/are allowed.
- 6) ☒ Claim(s) 1-12, 14-17, 19-24 and 28 is/are rejected.
- 7) ☒ Claim(s) 13 is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on ____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on ____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. ____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☒ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) ____
- 4) ☐ Interview Summary (PTO-413) Paper No(s). ____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____

DETAILED ACTION

Claim Rejections - 35 USC § 103

The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

Claims 1, 2 and 16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Applicant's prior art figure 19 in view of Janning and Herr et al. Prior art figure 19 discloses a linear motor with tubular outer and inner yokes, a coil and a permanent magnet but does not disclose a vibrator made of magnetic material. However, Janning teaches that the magnetic force between a permanent magnet and a coil is strongest when the air gap between them is as small as possible and further teaches placing the magnet close to the coil in column 2 lines 23-34. Since prior art figure 19 and Janning are both from the same field of endeavor, it would have been obvious at the time the invention was made for one of ordinary skill in the art to have moved the permanent magnet closer to the coil in the prior art figure 19 device by placing the magnet on the side of the vibrator closest to the coil. Herr et al. teaches in column 2 lines 29-32 that ferromagnetic material is useful for flux paths. Since Herr et al. and the prior art figure 19 device as modified by Janning are from the same field of endeavor, it would have been obvious at the time the invention was made for one of ordinary skill in the art to have utilized a vibrator made of a magnetic material to hold the permanent magnets of the prior art figure 19 device as modified by Janning in order to increase the efficiency of the device by reducing flux loss due to fringing.

Claims 3 and 12 is rejected under 35 U.S.C. 103(a) as being unpatentable over the prior art figure 19 device in view of Herr et al., Janning and Japanese reference 11-220846. The prior

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art figure 19 device as modified by Herr et al. and Janning discloses the linear motor with the vibrator made of magnetic material and having permanent magnets with alternating polarity as shown in figure Herr et al. figure 3 but does not disclose slits between adjacent magnets.

However Japanese reference 11-220846 teaches making slits between adjacent magnets in the abstract in order to limit the amount of flux lost to flux leakage and therefore increase the efficiency of the device. Since Japanese reference 11-220846 and the prior art figure 19 device are both from the same field of endeavor (a linear motor can be considered as a rotary motor cut in one place on the periphery with the stator and rotor flattened out), it would have been obvious at the time the invention was made for one of ordinary skill in the art to have utilized slits cut between the magnets which have alternating polarities in order to reduce flux leakage and therefore improve the efficiency of the motor.

Claims 4, 5, 14, 19, 20 and 23 are rejected under 35 U.S.C. 103(a) as being unpatentable over the prior art figure 19 device as modified by Janning and Herr et al. as applied to claim 1 above, and further in view of Mulgrave. The prior art figure 19 device as modified by Janning and Herr et al. discloses the linear motor with the vibrator but does not disclose the resistance level or permeability of the vibrator. However, Mulgrave teaches in column 1 line 65 to column 2 line 10 the problem of eddy current losses in an electric motor. A solution shown in the prior art is soft magnetic laminations as described in column 2 lines 41-47. Mulgrave utilizes sintered powder metals in his device as described in column 8 lines 44-65. While Mulgrave does not disclose electrical resistance and permeability values, either the lamination or the powered metal flux return paths can easily achieve the required electrical resistance and permeability because

the permeability value of more than 10 times that of vacuum is very low. Carbon steel can have permeability values thousands of times that of vacuum.

In regard to claims 14, 19 and 20, see Mulgrave column 8 lines 43-65.

In regard to claim 23, see Mulgrave column 8 lines 43-48.

Claims 6-10 are rejected under 35 U.S.C. 103(a) as being unpatentable over the prior art figure 19 device in view of Janning, Herr et al. and Watanabe (of record). The prior art figure 19 device as modified by Janning and Herr et al. discloses the linear motor with the vibrator but does not disclose the vibrator made of a material comprising iron and chrome. However, Watanabe et al. discloses a yoke used as a return flux path made of iron and chrome in column 2 lines 1-18 for the purpose of reducing eddy currents and thus increasing the efficiency of the machine. While the Watanabe device is a stepping motor, this stepping motor is stepped at a high enough frequency for it to have the same problems that face a vibrator. Also, the yoke is another part of the magnetic flux return path and therefore the teachings about yokes are applicable to other flux return elements in an electrical machine. Since Watanabe et al. and the prior art figure 19 device as modified by Janning and Herr et al. are both from the same field of endeavor, it would have been obvious at the time the invention was made for one of ordinary skill in the art to have utilized a yoke made of iron and chrome in the vibrator of the prior art figure 19 device as modified by Herr et al. and Janning in order to reduce eddy current losses and improve the efficiency of the device.

In regard to claim 10, see Watanabe column 3 line 60 to column 4 line 4.

Claim 11 is rejected under 35 U.S.C. 103(a) as being unpatentable over the prior art figure 19 device in view of Herr et al., Janning and Barbrook (of record). The prior art figure 19

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device as modified by Herr et al. and Janning discloses the linear motor with the magnetic vibrator but does not disclose making the vibrator from nickel and iron. However, Barbrook teaches making a yoke from these materials in column 1 lines 13-15 and teaches the advantages of nickel and iron alloys in column 2 lines 33-34. Since Barbrook and the prior art figure 19 device as modified by Herr et al. and Janning are both from the same field of endeavor, it would have been obvious at the time the invention was made for one of ordinary skill in the art to have made the vibrator from a nickel and iron alloy.

Claims 15 and 17 are rejected under 35 U.S.C. 103(a) as being unpatentable over the prior art figure 19 device as modified by Herr et al. and Janning and further in view of Lee (of record). The prior art figure 19 device as modified by Herr et al. and Janning discloses the linear motor with the vibrator but does not disclose the motor being used as a compressor. However, Lee et al. teaches using a linear motor as a compressor in column 4 lines 51-55. Since Lee et al. and the prior art figure 19 device as modified by Janning and Herr et al. are both from the same field of endeavor, it would have been obvious at the time the invention was made for one of ordinary skill in the art to have utilized the linear motor of the prior art figure 19 device as a compressor in situations where a compressor was needed.

Claims 21-24 and 28 are rejected under 35 U.S.C. 103(a) as being unpatentable over the prior art figure 19 device as modified by Janning, Herr et al. and Mulgrave as applied to claim 20 above, and further in view of Kishi (of record). The prior art figure 19 device as modified by Herr et al., Janning and Mulgrave discloses the linear motor with at least one of the inner and outer yokes made from a compressed material but does not disclose an electrically insulated layer on the yoke made from an inorganic material. However, Kishi teaches insulating yokes in

column 3 line 64 to column 4 line 14. Since Kishi and the prior art figure 19 device as modified by Herr et al., Janning and Mulgrave are both from the same field of endeavor, it would have been obvious at the time the invention was made for one of ordinary skill in the art to have insulated the yoke holding the windings with an inorganic material in order to protect the coil windings from short circuiting.

In regard to claims 24 and 28, see Mulgrave column 8 lines 43-48.

Allowable Subject Matter

Claims 13 is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Claims 26 and 27 are allowed.

The following is a statement of reasons for the indication of allowable subject matter:

The prior art of record does not disclose or teach a long and narrow slit extending along a vibrating direction of said vibrator in combination with the other elements of claim 13. The prior art of record does not disclose or teach making an inner or an outer yoke by arranging a plurality of multi-layered blocks with a spacing between adjacent blocks filled with a compression formed body as recited in claims 26 and 27.

Applicant's arguments with respect to claims 1-27 have been considered but are moot in view of the new ground(s) of rejection, except for the U. S. C. 112 rejection of claims 1-3, 12, 13, 15-17, 19-24, 26 and 27 regarding the specific direction of vibration. That rejection has been withdrawn due to Applicant's argument.

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Any inquiry concerning this communication or earlier communications from the examiner should be directed to Judson H Jones whose telephone number is 703-308-0115. The examiner can normally be reached on 8-4:30 M-F.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nestor Ramirez can be reached on 703-308-1371. The fax phone numbers for the organization where this application or proceeding is assigned are 703-305-3431 for regular communications and 703-305-3432 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-0956.

JHJ

July 23, 2002


NESTOR RAMIREZ
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